Amendment to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Currently Amended) A quantum-well semiconductor device that senses radiation energy, comprising:

a substrate of a substantially transparent semiconductor material; and

a plurality of quantum-well structures, arranged in columnar shapes and spatially separated from one another by a gap which is electrically insulating, said plurality of quantum-well structures formed over said substrate to form a periodic array **as an optical grating** to optically diffract light at a wavelength absorbed by said plurality of quantum-well structures,

wherein each quantum-well structure includes, a first conductive contact layer formed over said substrate, a quantum-well stack having a plurality of alternating quantum-well layers formed in parallel over said first conductive contact layer and operating to absorb radiation polarized perpendicularly to said quantum-well layers, and a second conductive contact layer formed over said quantum-well stack, and wherein each quantum-well layer in each quantum-well structure is continuous without a void and **each quantum-well structure** has opposing parallel side walls perpendicular to said substrate to form an optical cavity therebetween **in resonance with the wavelength**.

2. (Previously Presented) The device as in claim 1, further comprising a plurality of separate metallic elements respectively formed over said plurality of quantum-well structures.

3. (Currently Amended) The device as in claim 1, wherein dimensions and indices of said plurality of quantum-well structures and respective gaps are configured to make said optical cavity in a resonance condition so that a magnitude of received radiation having a polarization perpendicular to said quantum-well layers is greater than a magnitude of received radiation having a polarization perpendicular to said quantum-well layers when the resonance condition is not met.

4. (Previously Presented) The device as in claim 1, wherein each quantum-well structure includes at least two different stacks of quantum-well layers which respectively absorb light at two different wavelengths.

5. (Previously Presented) The device as in claim 1, wherein gaps between adjacent quantum-well structures include a dielectric insulator that has an index of refraction less than an index of refraction of each quantum-well structure.

6. (Currently Amended) A quantum-well semiconductor device that senses radiation energy, comprising:

a substrate of a substantially transparent semiconductor material; and

a plurality of quantum-well structures in columnar shapes formed over said substrate to form a periodic array **to effectuate an optical grating which diffracts light to have a component polarization perpendicular to the substrate**, and spatially separated from one another by a gap which is electrically insulating, wherein each quantum-well structure has opposing parallel side walls perpendicular to said substrate to form an optical cavity therebetween,

wherein each quantum-well structure includes, a first conductive contact layer formed over said substrate, a quantum-well stack having a plurality of quantum-well layers formed in parallel over said first conductive contact layer to absorb radiation polarized perpendicularly to said quantum-well layers, and a second conductive contact layer formed over said quantum-well stack.

7. (Previously Presented) The device as in claim 6, further comprising a plurality of separate metallic elements respectively formed over said plurality of quantum-well structures.

8. (Previously presented) The device as in claim 6, wherein dimensions and indices of said plurality of quantum-well structures and respective gaps are configured to make said optical cavity in a resonance condition so that a magnitude of received radiation having a polarization perpendicular to said quantum-well layers is greater than a magnitude of received radiation having a polarization perpendicular to said quantum-well layers when the resonance condition is not met.

9. (Previously Presented) The device as in claim 6, wherein each quantum-well structure includes at least two different stacks of quantum-well layers which respectively absorb light at two different wavelengths.

10. (Previously Presented) The device as in claim 6, wherein gaps between adjacent quantum-well structures include a dielectric insulator that has an index of refraction less than an index of refraction of each quantum-well structure, and wherein dimensions of each quantum-well structure are configured

to form an optical cavity between two opposing side-wall surfaces in said each quantum-well structure with a resonance at a wavelength of absorbed light.

11. (Previously Presented) The device as in claim 6, wherein each quantum-well structure further includes quantum well layers formed between said first conductive contact layer and said second conductive contact layer to absorb light at a wavelength different from a wavelength of light absorbed by said quantum-well stack.